



Digital Humanities  
UNIVERSITÄT LEIPZIG

# Numbers, winds and stars

Representing the ancient geographical language  
in the digital environment

Epigraphy Edit-a-thon  
Editing Chronological and Geographic data in ancient inscriptions  
April 21, 2016

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University of Leipzig & Università di  
Bari





# Some preliminary remarks



## What this conversation is about:

- Ancient documents containing geographical information in word-form
  - Large geographical texts
  - Inscriptions: *miliaria*, *itineraria* - and any type of textual information fitting the definition of geography
  - Technical geographical texts (*peripli*, itineraries, descriptive geography)

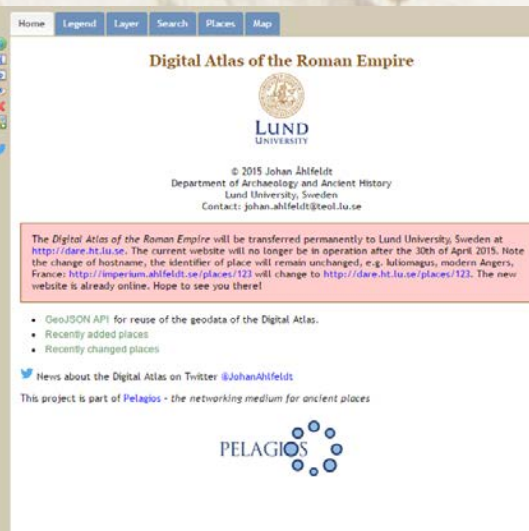
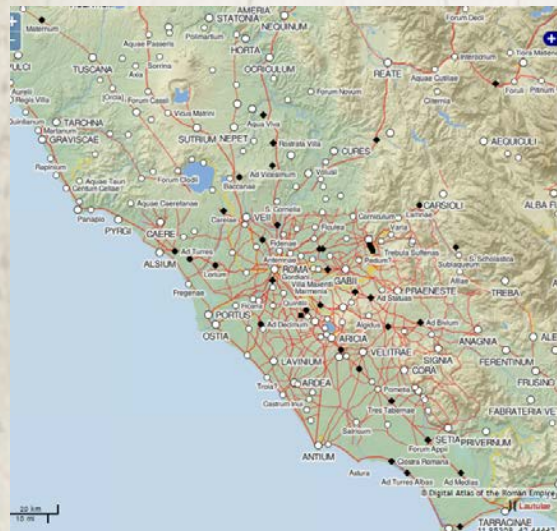




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europeana  
eagle project



GeoNames

The GeoNames geographical database covers all countries and contains over eight million placenames that are available for download free of charge.





phy - Go x Triples spreadsh x Inventory of Gre x Epigraphik Date x Digital-Agathen x EDB Quick Search x EDB Search Res x EDB Show Epigr x Chiara

www.edb.uniba.it/epigraph/184

Perseids | A Collabora Digital Humanities M stjaenicke/TRAViz · G A Companion to Digi Antike im Internet - n KIRKE Deutscher Althilolog Importati da IE

### view geographic position

Coordinates: 41.858822, 12.51081  
Address: Quartiere XX Ardeatino, Roma, Italia

Close

EDB184

eraining to Coem. Callisti pars  
nd Coem. Callisti pars inferior (v  
tulus sepulchralis insculptus  
abula marmorea  
asl recorded in Roma, Coem C  
ate: 300-350  
dition(s) ICVR IV, 10565

--] "Ασκληπιόδο[ότη] ---]  
-- κ]ατ(ά)θες(ι)ς θυγατρ[ρ  
Ασκληπιόδο[τοζ]  
ατήρ



# A not map-based society: Premodern geography as hodological space

- Cartographic vs. Hodological space
- Cartography was used for different purposes than travelling
- Hodological space was empirical: functional to travel and spatial practice in general

A different system of spatial knowledge





# ➤ Consequence: modern maps are bad for you!

*If we are limited to the representation of non-cartographic geography on cartographic maps, we will end in emphasizing its errors and not its cultural specificity*



# Numbers, winds, stars...and other things

## ➤ Distances: the «ennemi numéro 1» of men

- The numerical estimate depended on the concrete conditions of travel
- Several units of measurement (in the widest way possible)

## ➤ Systems of orientation

- Fixed: winds, stars, cardinal points, etc.
- Unfixed: unsystematic, environmental, cultural references

## ➤ Spatial knowledge as a «mental model»:

- Cultural aspects of spatial practice: associations between places and concepts (e.g. boundaries)
- Place definition: what «is» a place in the ancient world, and when something is considered a «place»?
- Landmarks: the quintessential of hodological space, environment-driven or culture-driven (or both)?





Portus Magnus m.p. XXXVI  
Quiza municipium m.p. XL  
Arsenaria m.p. XL  
Cartenna colonia m.p. XVIII  
Iar castellum m.p. XIII

*(Itinerarium Antonini, 14-15)*





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*(Itinerarium Antonini, 14-15)*



[Ti(berius) C]aesar divi Augusti f(ilius)  
[A]ugustus imp(erator) pontif(ex)  
max(imus) trib(unicia) potest(ate) XXI  
co(n)s(ul) III viam a Salonis ad  
Hedum castel(lum) Daesitiatium per  
mill[i]a(!) passuum CLVI munit et  
idem viam ad Batinum flumen quod  
dividit Breuc[o]s Oseriatibus a Salonis  
munit per mi[l]li)a(!) passuum CLVIII

...

(CIL 03, 3198)



[Ti(berius) C]aesar divi Augusti f(ilius)  
[A]ugustus imp(erator) pontif(ex)  
max(imus) trib(unicia) potest(ate) XXI  
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CLVIII ...

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**CLVIII...**

(CIL 03, 3198)





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**Salonis** munit **per mi[lli]a(!) passuum**  
**CLVII...**

(CIL 03, 3198)



ἀπὸ **Πάφου** εἰς **Ἀλεξάνδρειαν** διάρμα **βορέου** **σταδίων** ,γω.

ἀπὸ **Παχύνου** ἐπὶ **Λιλύβαιον** διὰ **πελάγους** **στάδια** ,αφκ.

(Agathemerus, *Sketch of Geography*)





[M(arcus) Vinicius P(ublii) f(ilius), M(arci)  
n(epos), P(ublii) pron(epos), co(n)s(ul) II,  
VIIvir epulonum, Sodalis, A]ugustalis  
h[on(oratus) decurionalibus] ornamentis,  
viam, ab angiporto aed[is] Iunonis Lucinae  
usque [ad] aedem Matutae, et clivom, ab  
ianu ad gisiarios (!) porta[e] Stellatinae, et  
viam patulam, ad portam laevam et ab  
foro ad portam domesticam, sua pecunia,  
stravit.

CIL X, 4660





[M(arcus) Vinicius P(ublili) f(ilius), M(arci)  
n(epos), P(ublili) pron(epos), co(n)s(ul) II,  
VIIvir epulonum, Sodalis, A]ugustalis  
h[on(oratus) decurionalibus] ornamentis,  
**viam, ab angiporto aed[is] Iunonis**  
**Lucinae usque [ad] aedem Matutae, et**  
**clivom, ab ianu ad gisiarios (!) porta[e]**  
**Stellatinae, et viam patulam, ad portam**  
**laevam et ab foro ad portam domesticam,**  
sua pecunia, stravit.

CIL X, 4660





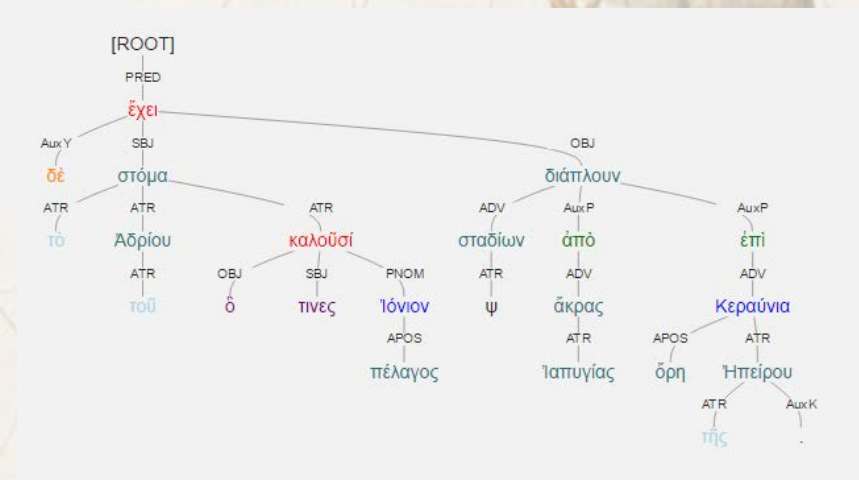
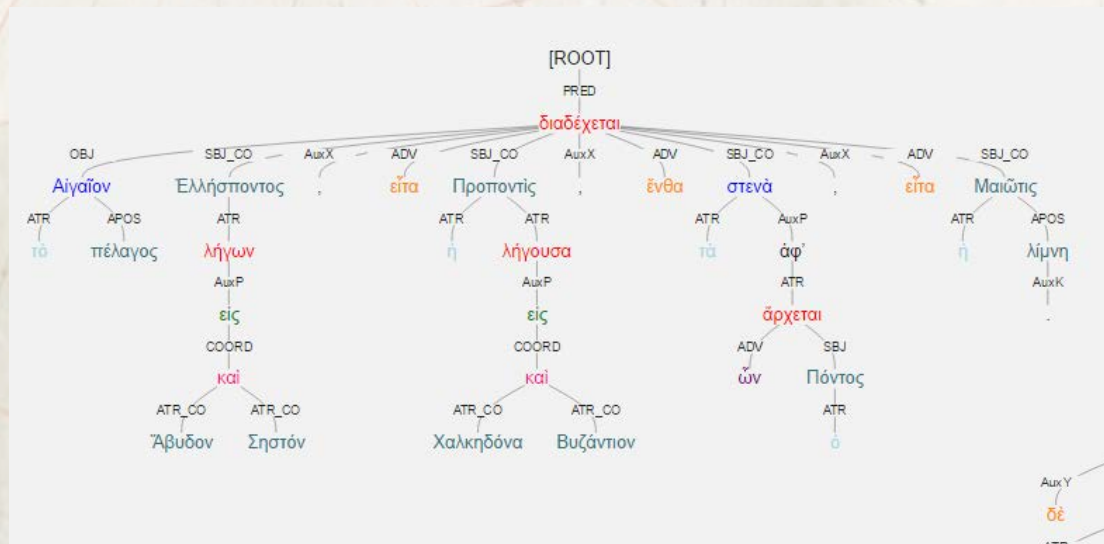
# Back to the text: High Precision Philology applied to spatial practice

- We need a high degree of formalization to make use of these texts in the digital environment.
- We do not want to create things from scratch, building a zoo of new tools that nobody but us will be able to use.
- We want to use what is already at hand, has reached high standards and can be adapted and refined through collaborative efforts.



## 1. Linguistic annotation

- How space is expressed through morphosyntactic constructs
- How descriptive geography changes across time and contexts







## 2. Semantic annotation

- Stage 1:

Free-scheme annotation for the creation of different datasets

- Stage 2:

Creation of bottom-up vocabularies for standardizing annotation layers and suggest guidelines for crowdsourcing efforts

- Towards a «critical lexicon» of ancient geography
- Towards a standard for culture-related systems of spatial representation



Book 1

Book 2

Book 3

Book 4

Book 5

Homer: The Odyssey

800 - 700 BC

42 Annotations · No Other Contributors

ANNOTATION MODE:

NORMAL

QUICK

BULK

COLOR:

BY TYPE

BY STATUS

Tell me, O muse, of that ingenious hero who travelled far and wide after he had sacked the famous town of Troy. Many cities did he visit, and many were the nations with whose manners and customs he was acquainted; moreover he suffered much by sea while trying to save his own life and bring his men safely home; but do what he might he could not save his men, for they perished through their own sheer folly in eating the cattle of the Sun-god Hyperion; so the god prevented them from ever reaching home. Tell me, too, about all these things, O daughter of Jove, from whatsoever source you may know them.

So now all who escaped death in battle or by shipwreck had got safely home except **Ulysses**, and he, though he was longing to return to his wife and country, was detained by the goddess **Calypso**, who had got him into a large cave and wanted to marry him. But as years went by, there came a time when the gods settled that he should go back to **Ithaca**; even then, however, when he was among his own people, his troubles were not yet over; nevertheless all the gods had now begun to pity him except **Neptune**, who still persecuted him without ceasing and would not let him get home.

Now **Neptune** had gone off to the Ethiopians, who are at the world's end, and lie in two halves, the one looking West and

Trismegistos Places (GEO and GEOREF)

Search Trismegistos:

Search

Places

TM Home

About

Contact

QUICKSEARCH

Place (text)...

Geo\_ID (number)...

Georefid (attest. numbe

» Advanced Search (GEO)

» Advanced Search (GEOREF)

PLACES (GEO)

Home

List all places (GEO)

List all attestations (GEOREF)

Data Standards (GEO)

Data Standards (GEOREF)

Pick from Map

KULeuven Fayum Project

Places (GEO and GEOREF)

Currently **47670** place records (GEO) and **197357** place attestation records (GEOREF).

A database of places related to the ancient world by Trismegistos

Based on the foundations of the Fayum Project (Graeco-Roman Egypt) of the KULeuven and the project Multilingualism and Multiculturalism in Graeco-Roman Egypt of Cologne University.

Fully reworked in a project sponsored by the [Hercules Foundation](#).

Expanded to places outside Egypt in the framework of the CIP Europeana EAGLE project.

General coordination (Trismegistos): Mark Depauw, Herbert Verreth

General coordination (Fayum Project): Willy Clarysse, Katelijn Vandorpe

Database structure (Filemaker 7-11): Bart Van Beek

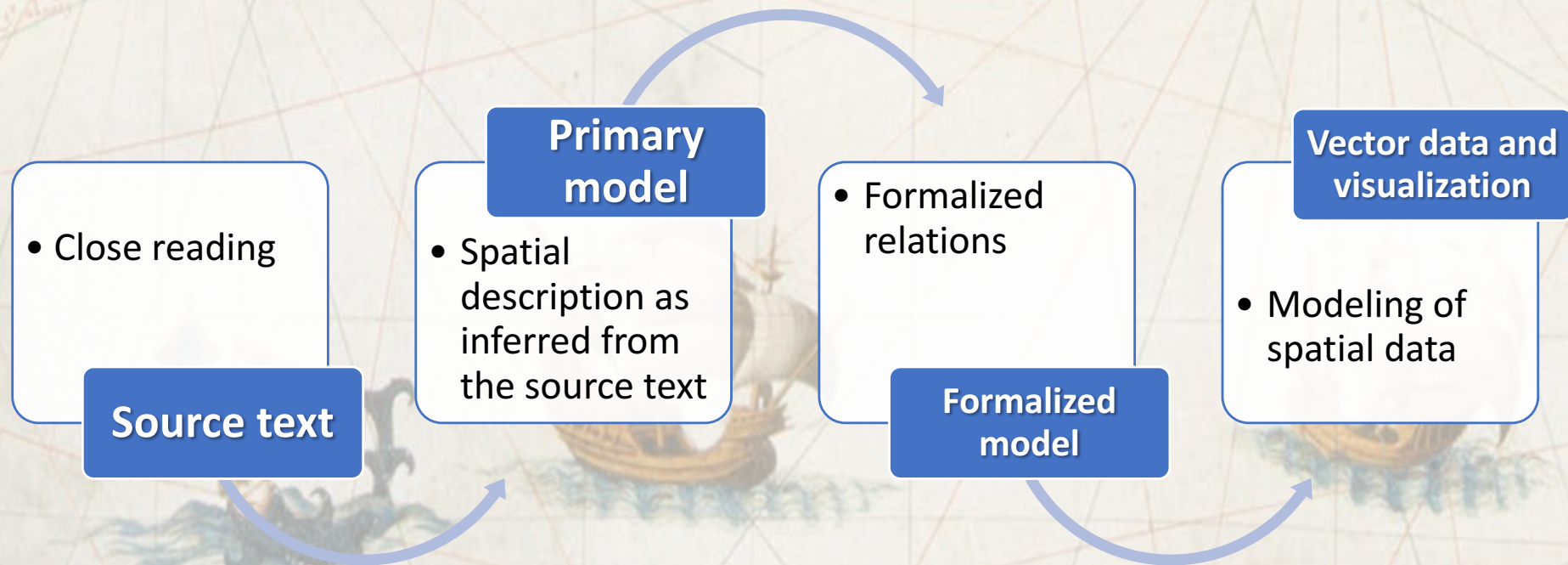
Online version (PHP & MySQL): Jeroen Clarysse, Bart Van Beek, Mark Depauw

Data processing (Fayum Project): Bart Van Beek; formerly Hans Proost, Inge Uytterhoeven

Data processing (Trismegistos): **Herbert Verreth**



### 3. Modelling spatial practice: critical stepwise formalization







**Portus Magnus** m.p. XXXVI  
**Quiza municipium** m.p. XL  
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*(Itinerarium Antonini, 14-15)*

**Step 1: Source text**



A Portu Divino **Portus**  
**Magnos** m.p. XXXVI  
A Portu Magno **Quiza**  
**municipium** m.p. XL  
A Quiza **Arsenaria** m.p. XL  
Ab Arsenaria **Cartenna**  
**colonia** m.p. XVIII  
A Cartenna **Iar** **castellum**  
m.p. XIII...

*(Itinerarium Antonini, 14-15)*

## Step 2: Primary model





A Portu Divino **Portus**  
**Magnos** m.p. XXXVI  
A Portu Magno **Quiza**  
**municipium** m.p. XL  
A Quiza **Arsenaria** m.p. XL  
Ab Arsenaria **Cartenna**  
**colonia** m.p. XVIII  
A Cartenna **Iar** **castellum**  
m.p. XIII...

(*Itinerarium Antonini*, 14-15)

Node: Place A

A Portu  
Divino

m.p. XXXVI

Edge: distance

Node: Place B

**Portus**  
**Magnos**

Step 3: formalized model

Type 1: distance



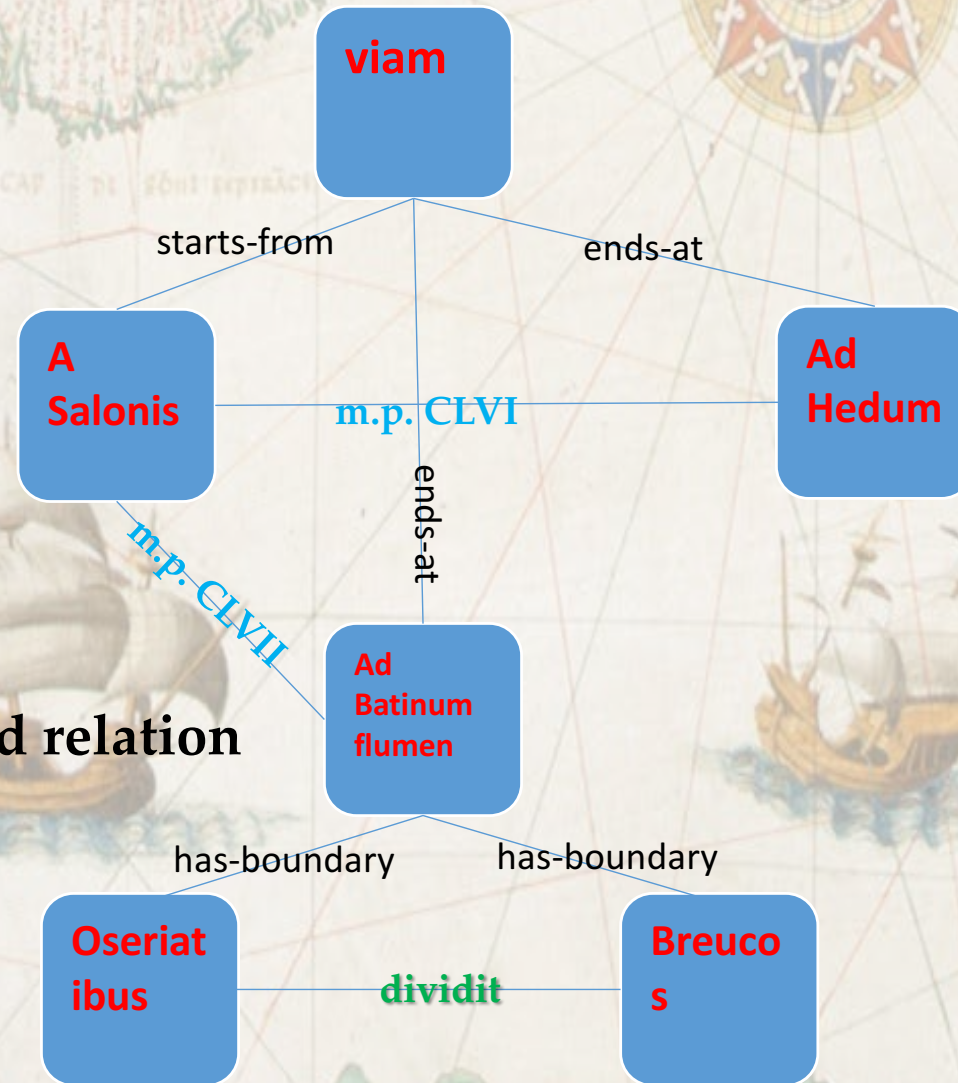


[Ti(berius) C]aesar divi Augusti f(ilius)  
[A]ugustus imp(erator) pontif(ex)  
max(imus) trib(unicia) potest(ate) XXI  
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**dividit Breuc[o]s Oseriatibus a**  
**Salonis** munit **per mi[lli]a(!) passuum**  
**CLVII...**

(CIL 03, 3198)



viam a Salonis ad Hedum  
castel(lum) Daesitiatum per  
mill[i]a(!) passuum CLVI munit et  
idem viam ad Batinum flumen  
quod dividit Breuc[ol]s  
Oseriatibus a Salonis munit per  
mi[lli]a(!) passuum CLVII



Type 2: distance + underspecified relation



## ➤ A spatial system defined by relations

- **Place A**
- Distance estimate
- Direction (conventional system of orientation)
- Underspecified indication (unconventional system of orientation): various degrees of relations between places
- **Place B**



**Triples spreadsheet - formalized** ☆

File Modifica Visualizza Inserisci Formato Dati Strumenti Modulo Componenti aggiuntivi Guida L'ultima modifica è avvenuta 9 ore fa

Node A (place)

	A	B	C	D	E	F	G
1	<b>Node A (place)</b>	<b>Edge 1: type:distance</b>	<b>Edge 2 : type:formalised direction</b>	<b>Edge 4: Underspecification</b>	<b>Edge: type</b>	<b>Node B (place)</b>	<b>Formalised relation</b>
2	ή μεγάλη Σύρης	σταδίων ,ε			perimeter	undefined	Place A - distance - Place A
3	ή δε μικρά	σταδίων ,αχ			perimeter	undefined	Place A - distance - Place A
4	ἀπὸ Τανάιδος ποταμοῦ ἐκβολῶν	σταδίων μυριάδων ἑξ καὶ ,θψθ			distance	ἕως Ἡρακλείων σπηλῶν	Place A - distance - Place B
5	ἀπὸ Τιγγὸς	σταδίων μυριάδων δύο καὶ ,θσνβ			distance	ἕως στόματος Κανωβικοῦ	
6	ἀπὸ Γάγγου	σταδίων μυριάδων ς καὶ ,ηφμε			distance	εἰς τὰ Γάδαιρα	
7							
8	ἀπὸ μὲν Γάγγου ποταμοῦ	σταδίων μυριάδων τεσσάρων καὶ χιλίων ψκε			distance	ἕως Μυριάνδρου	
9	Μυριάνδρου				containment: in	ἐν Ἰστικῷ κόλπῳ	
10							
11	ἀπὸ Γάγγου	σταδίων μυρίων ,ς			distance	ἐπὶ ἐκβολᾷ Ἰνδοῦ ποταμοῦ	
12	ἀπὸ Ἰνδοῦ	μυρίων πεντακισχιλίων τριακοσίων			distance	ἕως Κασπίων πυλῶν	
13	[Κασπίων πυλῶν]	σταδίων μυρίων ν			distance	ἐπὶ τὸν Εὐφράτην	
14	[Εὐφράτην]	σταδίων τοε			distance	εἰς Μυριάνδρον	
15	ἀπὸ δε Μυριάνδρου	σταδίων διςμυρίων ,ςωκ			distance	ἐπὶ Γάδαιρα	
16	ἀπὸ Μυριάνδρου	σταδίων χιλίων τετρακοσίων			distance	ἐπὶ Κλεῖδας Κύπρου	

+ Special cases Texts Texts nodes and edges - formalised Inscriptions nodes and edges - formalised Inscriptions

<https://docs.google.com/spreadsheets/d/1PNgaqHtqP65U1npo2PCtU0x-7ZuR5JeBfof2aXcxLpU/edit?usp=sharing>



# Triples?

- An RDF-based approach? Opportunities and limits
- A different model? Some work in progress...



<http://maximromanov.github.io/mARkdown/>

```

2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033
||| ##
# فاعلم ان الواو للجمع و ثم للترتيب NoteV01P106N02 وأو للتخيير
# فإذا قلنا الى فلاة وفلاة فإنهما في موضع واحد مثل خليم وأمج ومزبان
# وبهم أداد NoteV01P106N03 فان قلنا ثم أردنا العطف على الذي قبله كقولنا
# الى بطن مر NoteV01P106N04 ثم الى عسقان الى غزة ثم الى رفح
# NoteV01P106N05 فان قلنا أو فقد رجعتا الى الذي قبل هذا 10 الآخر كقولنا
# من الرملة الى إيليا NoteV01P106N06 أو الى عسقان من شيراز الى جويم أو
# الى صاحبه NoteV01P106N05 وقد جعلنا المراحل ستة NoteV01P106N07 فراع
# وسبعة فان زادت نقطتنا على الهاء نقطتين فان جاوزت العشرة نقطتنا تحت
# NoteV01P106N08 اللام نقطتين فان نقصت عن الستة نقطتنا فوق الهاء نقطة
# تأخذ من مكة الى بطن مر مرحلة
# TOWA#FROM#مكة بطن مر DIST#مرحلة
# TOWA#FROM#بطن مر عسقان DIST#مرحلة
# TOWA#FROM#عسقان أمج مرحلة
# TOWA#FROM#أمج عسقان DIST#مرحلة
# TOWA#FROM#عسقان الخيم NoteV01P106N09 مرحلة
# TOWA#FROM#الخيم DIST#مرحلة
# TOWA#FROM#الخيم أمج DIST#مرحلة
# TOWA#FROM#أمج الجحفة مرحلة
# TOWA#FROM#الجحفة DIST#مرحلة
# TOWA#FROM#الجحفة الأواء مرحلة
# TOWA#FROM#الأواء DIST#مرحلة
# TOWA#FROM#الأواء سقيا بني غفار NoteV01P106N10 مرحلة
# TOWA#FROM#سقيا بني غفار DIST#مرحلة
# TOWA#FROM#سقيا بني غفار العرج مرحلة
# TOWA#FROM#العرج DIST#مرحلة
# TOWA#FROM#العرج الروحاء مرحلة

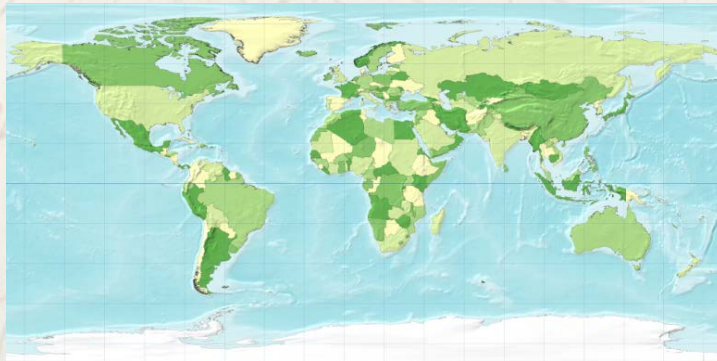
```

ὑπὲρ δὲ τὸ Ἰκάριον ἐξῆς ἀναχεῖται τὸ Αἰγαῖον.  
 # Ἐστὶ δὲ ὁ τῆς Εὐρώπης παράπλους  
 ##FROM ἀπὸ Ταναΐδος ποταμοῦ ἐκβολῶν ##TOWA ἕως Ἡρακλείων στηλῶν ##DIST  
 σταδίων μυριάδων ἐξ καὶ θψθ,  
 τῆς δὲ Λιβύης  
 ##FROM ἀπὸ Τιγγὸς ##TOWA ἕως στόματος Καναβικοῦ ##DIST σταδίων  
 μυριάδων δύο καὶ θσνβ  
 τῆς δ' Ἀσίας  
 ##FROM ἀπὸ Κανώβου ##TOWA ἕως Ταναΐδος ποταμοῦ # μετὰ τῶν κόλπων ὁ  
 παράπλους ##DIST σταδίων μυριάδων δ καὶ ρια  
 ὁμοῦ παράλιος σὺν κόλποις τῆς καθ' ἡμᾶς οἰκουμένης σταδίων μυριάδων ιγ  
 καὶ , θοβ συμμετρουμένης τῆς Μαϊώτιδος λίμνης, ἥς περίμετρος σταδίων ,θ,  
 τὸ δὲ στόμα ὁ Κιρμέριος Βόσπορος σταδίων κ.  
 # ὁ δὲ Πόντος σταδίων ,γτν.  
 ὁ δὲ Θράκιος Βόσπορος τὰ στενὰ ὅπη Δαρεῖος ἐξευξεν ἐπὶ Σκύθας τὴν σχεδίαν  
 σταδίων ἐξ.  
 # Ἡ δὲ Περσικὴ θάλασσα κυκλοτερὴς οὔσα συνάγουσα τὸ στόμα ἄκρῳ Καρμανίας  
 καὶ Ἀραβίας περίμετρον ἔχει μυριάδων δύο σταδίων.  
 ἔστι δὲ τὸ μετὰ τὸ στόμα Ἀραβίας καὶ Καρμανίας σταδίων υ.  
 # Ἡ δὲ Ὑρκανία ἥτοι Κασπία θάλασσα μηνοειδὴς οὔσα, κατὰ δὲ τινὰς καὶ  
 προμήκης, ἐστὶ σταδίων δισμυρίων, τοῦ δὲ στόματος ἔχει τὸ διάγραμμα σταδίου  
 α.  
 # Ὁ δὲ Ἀράβιος κόλπος στενὸς ὢν καὶ προμήκης ἄρχεται  
 ##FROM ἀπὸ Ἡρώων πολίτου μυχοῦ # παρὰ τὴν Τρωγλοδυτικὴν ##TOWA ἕως τῆς  
 Πτολεμαΐδος τῆς ἐπὶ θήρας ##DIST σταδίων ,θ τὸ μήκος,  
 τὰ δὲ κατὰ Δειρὴν στενὰ σταδίων ξ,  
 ἐνθεν ἐξῆς πλοῦς σταδίων ,ςφ,

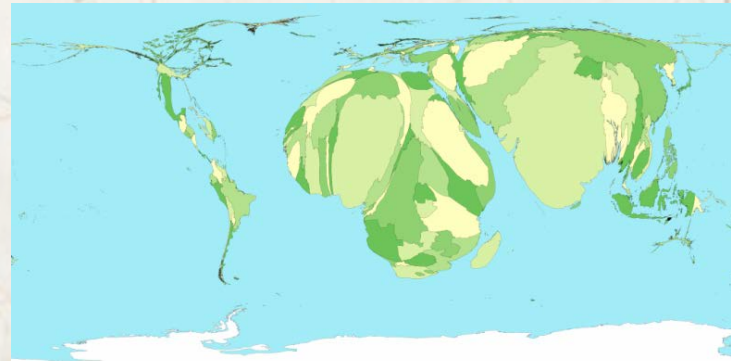


# New models?

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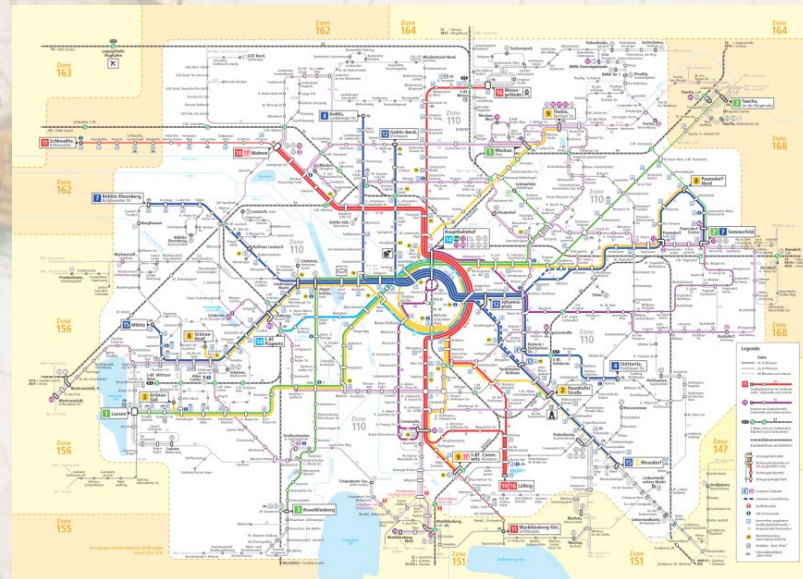
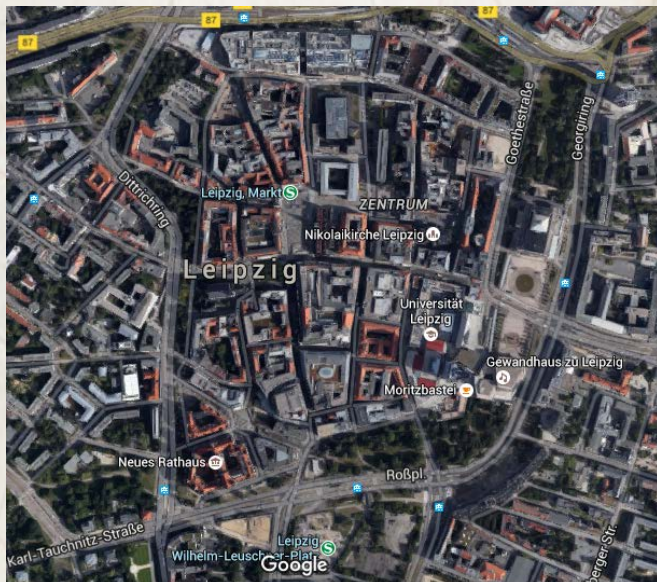


A normal world map



Child mortality

Modelling concepts:  
From semantic  
annotation



Modelling movement



# Boundaries and limits (not only geographic)

- Underspecification: pervasive in ancient sources
- Implicit information
- Ambiguity / Disjunction
- Physically fragmentary information

**Interpretation**



- We live in a world of maps





# “SPACE” in the Geohumanities

- Space is not simply natural geography: it is shaped by society as a means of control, of domination, of power (Lefebvre, *The production of Space*)
- **Space impacts on everything:** politics, war, religion, society, history, communication
- **Perception of space shapes human life**



« Plutôt que ... de déplorer ses "erreurs" ou ses "défauts" - ce qui n'a strictement aucun intérêt, puisque un tel jugement a pour point de départ *notre* conception de la convenance géographique, alors que c'est la nature même d'une œuvre qui est à saisir dans son contexte de production et de réception -, on se plaira à relever tout d'abord l'énorme travail de collecte et d'interprétation des données auquel s'est consacré son auteur ».

(P. Gautier Dalché, 2009, 19)

# Thanks for the attention!